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Notes on behaviour and breeding of the Razo Lark *Alauda razae*

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The Razo Lark *Alauda razae* lives exclusively on the arid islet of Razo (7 km²) in the Cape Verde Islands. It was discovered in 1897 by Boyd Alexander, who named it *Spizocorys razae*, without giving reasons for referring it to that genus (Alexander 1898a). Shelley (1902) placed it in *Callandrella* (*sic*), also without comment. Bianchi (1905) pointed out that the species has a small but distinct first primary, this being absent in *Spizocorys* and *Calandrella*. Although he thought it was close to the latter, he found it sufficiently different to erect the monotypic genus *Razocorys* for it. It remained there until Meinertzhagen (1951) lumped both *Spizocorys* and *Razocorys* in *Calandrella*, regarding *razae* as “a relict species developed in isolation from an age-old migration of one of the *C. rufescens* group”. Finally, Hall (1963) made it clear that *razae*, in view of its structural characters, is closest to *Alauda*, especially *A. gulgula*, and that the differences between *razae* and *A. arvensis* (small size, less pointed wing and longer bill of *razae*) are all attributable to adaptations for life on a small island. She noted that *razae* in general appearance seems to lie between *Alauda* and *Galerida*. Burton (1971), who agreed entirely with Hall's conclusions, drew attention to the remarkable sexual size dimorphism, especially in bill length, in *razae*, pointing to a difference in feeding ecology between the sexes. de Naurois (1969) suggested a relationship between *razae* and *Pseudalaemon fremantlii* of northeastern Africa on account of similarities in structure and plumage pattern. Hall & Moreau (1970) submerged *Pseudalaemon* in *Galerida*. Earlier, Harrison (1966) had already advocated the forming of a wide genus *Alauda*, combining many small or monotypic genera of larks, including *Galerida* and *Pseudalaemon*, but not *Calandrella*. Obviously, there is no agreement about the nearest relative of *razae*, but a recent consensus has developed that it is a

species of the *Alauda-Galerida* assemblage. The following notes may provide some material for a further taxonomic analysis.

Observations on behaviour and song

On 1 Mar 1986 and 3 Jan 1988, I visited Razo and made observations on display, vocalizations and breeding of *A. razae*. Sound recordings were made on a Sony WM-D6 cassette recorder with a Nakamichi CM300/CP4 microphone. Sonagrams were made on a Kay Sonagraph 7029 A, using wide band frequency.

On both dates, the larks occurred mainly on the central plateau of the island. Smaller numbers were observed nearer the cliffs and between the 2 hill ridges in the north. Adult birds were seen feeding together and all of them appeared to be paired. Singing birds were commonly heard and birds in both fresh and worn plumage were observed. Besides these, several juveniles were noticed. Altogether, an estimate of 75–100 pairs was made.

Two types of song were distinguishable. The first consisted of short phrases of about one second, with pauses in between phrases also lasting about one second (Fig. 1A). It was uttered both on the wing or while perched on a stone or rock. This appears to be the same song as described by Alexander (1898b), consisting of "the call notes constantly repeated". It is not unlike the song of *A. arvensis* when perched, though probably less variable. The second song type was of a more continuous nature and only heard from birds in song flight, delivered at a height of c. 25 m (Fig. 1B). The birds remained in a constant position against the strong NNE wind. Descent was performed at high speed while the singing continued. Generally, the first part of a song flight consisted of the short-phrased type, while towards the end and during descent the more continuous song was heard. The duration of 3 song flights was timed and lasted 5'15", 6'20" and 2'10". In addition, several call notes were recorded (Fig. 1C–F).

When compared with utterances of *A. arvensis*, it will be seen that both song and calls of *razae* show a great structural resemblance to those of *arvensis*. For sonagrams of *A. arvensis*, see Glutz & Bauer (1985) and Cramp *et al.* (1988).

On 3 Jan, a display was observed in which the male hopped several times c. 10 cm off the ground with head stretched upwards, chest pushed forwards and wings kept off the body a little. Whilst the posturing male encircled the female in this manner, the latter seemingly paid little attention and continued feeding. This hopping display was similar to that of *A. arvensis* as described by Delius (1963); see also Glutz & Bauer (1985) and Cramp *et al.* (1988).

The observations on song and display support Hall's view, which was based on morphological features, that *razae* is closely similar to the skylarks.

Breeding data

On 3 Jan, several birds were collecting nest material and a couple of empty nests were found. These were cup-shaped and undomed, built of dry

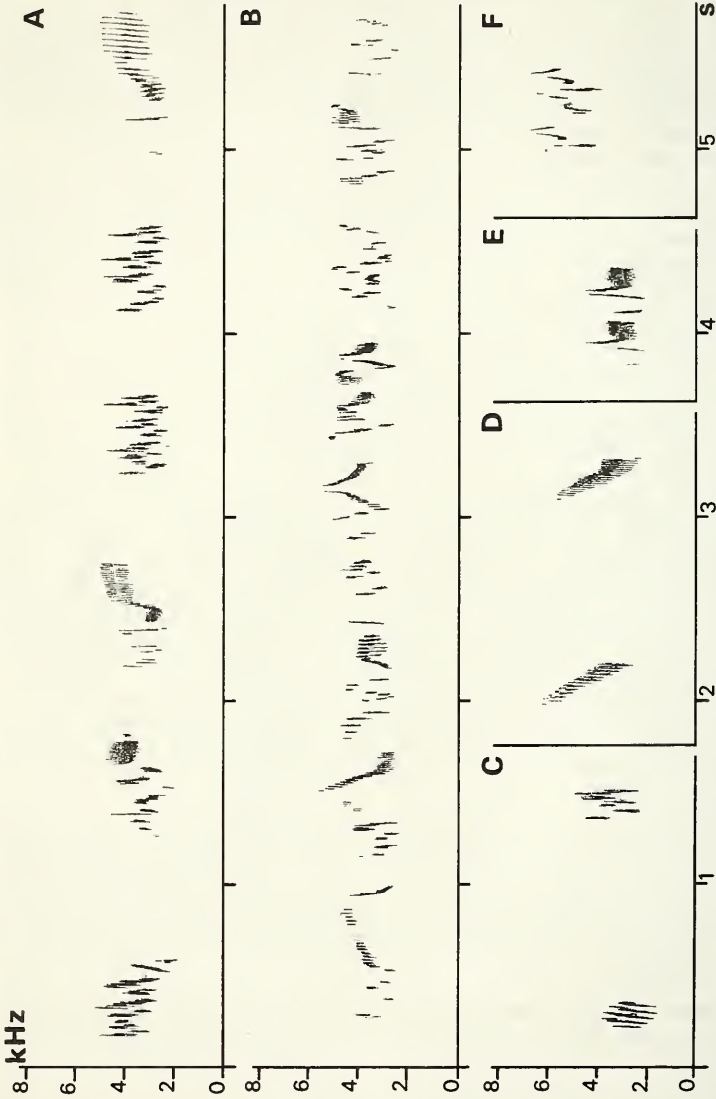


Figure 1. Sonograms of short-phrased song (A), continuous song (B) and calls (C-F) of *Alauda razae*. Recorded 1 March 1986 by C. J. Hazevoet.

grasses and hidden under a low shrub. Measurements of one nest were: outer diameter 10 cm, inner diameter 7 cm and depth 5.5 cm. On the same date, birds carrying food in a definite direction were seen several times but nests containing young could not be found. It may be noted here that the caption for plate 11 in Schleich & Wuttke (1983), stating that the bird shown is "digging its breeding hole", suggesting that *razae* breeds in holes under the ground, must be due to a misinterpretation of behaviour of an obviously foraging bird.

On 1 Mar, a nest containing one egg was found and photographed. No measurements were taken. The egg was whitish with fine brownish or greyish spots, increasing towards the broad end. The only eggs known so far were collected by Alexander (1898b) on 7 Oct 1897; they cannot be traced and are presumed lost. He described them as resembling those of *Lullula arborea* both in coloration and dimensions, an opinion repeated by de Naurois (1987). However, comparison of the photograph of the egg with plate 79 in Cramp *et al.* (1988) shows that it is similar in coloration to example 4 of *Galerida cristata* and, to a lesser degree, to example 2 of *Calandrella rufescens*. It does not resemble any of the depicted eggs of *L. arborea*. Apart from a nest with eggs found on 7 Mar 1985 (van Harreveld 1985), the above constitute the only egg-dates known so far. A nest containing one young was found on 28 Apr (Alexander 1898a). Juveniles were reported in Nov (Salvadori 1899), Jan (de Naurois 1969) and Jun (Nørrevang & den Hartog 1984). These data suggest a prolonged, erratic breeding season, probably linked to the degree of rainfall in a particular year or season.

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Zoogeographic support for the Spanish Imperial Eagle as a distinct species

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Based mainly on morphological and behavioural criteria several past authors (e.g. Brehm 1861, Dresser 1873, Swan & Wetmore 1924, Hiraldo *et al.* 1976) have considered the Spanish Imperial Eagle *Aquila adalberti* Brehm 1861 as specifically distinct from its Eastern congener, *Aquila heliaca* (Savigny 1809). However, lacking more evidence supporting this distinction, most other authors (e.g. Hartert 1914, Vaurie 1965, Amadon 1982) divide the Imperial Eagle merely into 2 different subspecies, naming *Aquila heliaca heliaca* the Eastern and *Aquila heliaca adalberti* the Spanish Imperial Eagle. Most recently, Collar & Andrews (1988) in the *ICBP World Checklist of Threatened Birds* distinguish *adalberti* and *heliaca* specifically from each other.

At present the ranges of the eagles are separated by a wide gap in central Europe (see Cramp & Simmons 1980), and being allopatric, geographically isolated populations, the most important of the species criteria, i.e. the presence or absence of reproductive isolation (Mayr 1969a), cannot thus be used to determine their taxonomic status. The problem could be solved if it was possible to show that at some historical period, populations of both taxons occupied the same (sympatry) or contiguous (parapatry) ranges; in which case the presence of hybrids would prove a lack of reproductive isolation, while their absence would confirm the specific distinction (Mayr 1969b).

Gonzalez *et al.* (in press), revising the distribution of the Spanish Imperial Eagle since the 19th century, show that it has bred in the west of the Iberian Peninsula and in Morocco, while immatures during post-breeding dispersal have appeared at least in northeastern Spain, southern France and Libya. The purpose of this paper is to show that in that period the Eastern Imperial Eagle was breeding in the eastern Spanish Pyrenees,